

Question 1

The value of $\sec^2(\tan^{-1} 3) + \csc^2(\cot^{-1} 5)$ will be -

(A) 32

(B) 24

(C) 28

(D) 36

Question 2

If $\sin^{-1} x - \cos^{-1} x = \pi/6$, then $x =$

(A) $-1/2$

(B) $\sqrt{3}/2$

(C) $1/2$

(D) None of these

Question 3

The value of $\sin^{-1} [\cos(33\pi/5)]$ is -

(A) $\pi/10$

(B) $7\pi/5$

(C) $-\pi/10$

(D) $3\pi/5$

Question 4

The value of $2 \tan^{-1}[(1+x)/(1-x)] + \sin^{-1}[(1-x^2)/(1+x^2)]$ will be -

(A) $\pi/2$

(B) $\pi/4$

(C) π

(D) None of these

Question 5

If $x + y = 1$, $xy = 2$, then the value of $\tan^{-1} x + \tan^{-1} y$ will be -

(A) $\pi/4$

(B) $3\pi/4$

(C) $3\pi/2$

(D) $\pi/2$

Question 6

The value of $\tan^{-1}(x/y) - \tan^{-1}[(x-y)/(x+y)]$ will be -

(A) $3\pi/4$

(B) $\pi/2$

(C) 2π

(D) $\pi/4$

Question 7

The value of $\tan^{-1} [2 \cos (2 \sin^{-1} 1/2)]$ will be -

(A) π

(B) $\pi/2$

(C) $\pi/4$

(D) $\pi/8$

Question 8

If $\tan^{-1} \sqrt{x^2+x} + \sin^{-1} \sqrt{x^2+x+1} = \pi/2$ then the value of x will be -

(A) 0, -1

(B) 0, 1

(C) ± 1

(D) None of these

Question 9

If $\sin^{-1} x + \sin^{-1} y = 2\pi/3$, then $\cos^{-1} x + \cos^{-1} y$ is equal to -

(A) $2\pi/3$

(B) $\pi/3$

(C) $\pi/6$

(D) π

Question 10

The principal value of $\cos^{-1}(\cos 5)$ is:

(A) 5

(B) $\pi - 5$

(C) $2\pi - 5$

(D) $5 - \pi$

Question 11

The value of $\sum_{r=1}^{\infty} \tan^{-1} [1 / (1 + r + r^2)]$ is:

(A) $\pi/2$

(B) π

(C) 2π

(D) $-\pi/2$

Question 12

If $\sin^{-1}(x^2 - x^4/2 + x^6/4 - \dots) + \cos^{-1}(x^2 - x^4/2 + x^6/4 - \dots) = \pi/2$ and $0 < |x| < \sqrt{2}$, then the value of x is:

(A) $1/2$

(B) 1

(C) $-1/2$

(D) -1

Question 13

$-2\pi/5$ is the principal value of:

(A) $\cos^{-1}(\cos 7\pi/5)$

(B) $\sin^{-1}(\sin 7\pi/5)$

(C) $\sec^{-1}(\sec 7\pi/5)$

(D) None of these

Question 14

If $\cos^{-1} x > \sin^{-1} x$, then the correct option is:

(A) $x < 0$

(B) $0 \leq x < 1/\sqrt{2}$

(C) $1 < x < 0$

(D) $-1 \leq x < 1/\sqrt{2}$

Question 15

The correct option for the given statement/graph of inverse trigonometric functions is:

(A) $y = \sin|x|$

(B) $y = -\sin x$

(C) $|y| = \sin x$

(D) $y = \sin 2x$

Question 16

If $\sum_{r=1}^{\infty} \tan^{-1} (1 / 2r^2) = p$, then the value of $\sin p$ is:

(A) $-1/\sqrt{2}$

(B) 1

(C) 0

(D) $1/\sqrt{2}$

Question 17

If $\sum_{i=1}^{10} \sin^{-1}(x_i) = 5\pi$, then what is $\sum_{i=1}^{10} (x_i)$?

(A) 10

(B) 5

(C) 20

(D) 0

Question 18

The value of $2 \tan^{-1} x$ is $\pi - \sin^{-1} [2x / (1+x^2)]$ if:

(A) $x > 1$

(B) $|x| \leq 1$

(C) $x < 1$

(D) $x < -1$

Question 19

The value of $\sin \left[\left(\frac{1}{2} \right) \cos^{-1} \left(\frac{4}{5} \right) \right]$ is:

- a) $\frac{1}{10}$
- b) $\frac{1}{\sqrt{10}}$
- c) $\frac{4}{5}$
- d) None of these

Question 20

The value of $\sin^{-1}(4/5) + \sin^{-1}(5/13) + \sin^{-1}(16/65)$ is:

- | | |
|------------|------------------|
| a) $\pi/2$ | b) $\pi/2$ |
| c) $\pi/4$ | d) None of these |

Question 21

The value of $\tan^{-1} 2 + \tan^{-1} 3$ is:

- a) $\pi/2$
- b) $3\pi/4$
- c) $\pi/4$
- d) None of these

Question 22

The relation symbol in the blank of the following expression $\tan^{-1} 1 + \tan^{-1} 2 + \tan^{-1} 3$ _____ $2(\tan^{-1} 1 + \tan^{-1} 1/2 + \tan^{-1} 1/3)$ is:

a) >

b) <

c) =

d) None of these

Question 23

The value of $\tan \left[\frac{1}{2} \sin^{-1} \left(\frac{2a}{1+a^2} \right) + \frac{1}{2} \cos^{-1} \left(\frac{1-a^2}{1+a^2} \right) \right] =$

a) $a / (1-a^2)$

b) $2a / (1-a^2)$

c) $2a / (1+a^2)$

d) None of these

Question 24

The value of $\cot^{-1}[(ab+1)/(a-b)] + \cot^{-1}[(bc+1)/(b-c)] + \cot^{-1}[(ca+1)/(c-a)]$ is:

- a) 0
- b) 1
- c) a
- d) None of these

Question 25

If $\cos^{-1} x + \cos^{-1} y + \cos^{-1} z = \pi$, then the value of $x^2 + y^2 + z^2 + 2xyz$ is:

- a) 1
- b) 0
- c) π
- d) None of these

Question 26

If $\sin^{-1} x + \sin^{-1} y + \sin^{-1} z = \pi$, then the value of $x\sqrt{1-x^2} + y\sqrt{1-y^2} + z\sqrt{1-z^2}$ is:

a) xyz

b) $2xyz$

c) $1/xyz$

d) None of these

Question 27

If $\tan^{-1} x + \tan^{-1} y + \tan^{-1} z = \pi$, then the value of $x + y + z$ is:

- | | |
|------------|------------------|
| a) xyz | b) $2xyz$ |
| c) $1/xyz$ | d) None of these |

Question 28

If $\cos^{-1}(p/a) + \cos^{-1}(q/b) = \alpha$, then $p^2/a^2 - (2pq/ab) \cos \alpha + q^2/b^2$ is:

a) $\sin \alpha$

b) $\sin^2 \alpha$

c) $\sin^3 \alpha$

d) None of these

Question 29

The solution of $\tan^{-1}[(x-1)/(x-2)] + \tan^{-1}[(x+1)/(x+2)] = \pi/4$ is:

- a) $x = 1/2$
- b) $x = \pm 1/\sqrt{2}$
- c) $x = 1/3$
- d) None of these

Question 30

The solution of the equation $\tan^{-1} \left[\frac{\sqrt{1+x^2} - \sqrt{1-x^2}}{\sqrt{1+x^2} + \sqrt{1-x^2}} \right] = \alpha$ is given by $x^2 =$:

a) $\sqrt{\sin 2\alpha}$

b) $\sqrt{\sin \alpha}$

c) $\sqrt{\cos 2\alpha}$

d) None of these

Question 31

The value of $\tan^{-1}(\sqrt{3}) - \sec^{-1}(-2)$ is:

- a) $\pi/3$
- b) $-\pi/3$
- c) $\pi/8$
- d) None of these

Question 32

The value of $\tan^{-1}(1/3) + \tan^{-1}(1/5) + \tan^{-1}(1/7) + \tan^{-1}(1/8)$ is:

- a) $\pi/2$
- b) $\pi/3$
- c) $\pi/4$
- d) None of these

Question 33

The value of $\cot^{-1} 7 + \cot^{-1} 8 + \cot^{-1} 18$ is:

- a) $\cot^{-1} 3$
- b) $\cot^{-1} 2$
- c) $\cot^{-1} 7$
- d) None of these

Question 34

The value of $\tan^{-1} [1 / \sqrt{x^2 - 1}]$ is:

a) $\pi/2 - \sec^{-1} x$

b) $\pi - \sec^{-1} x$

c) $\pi/2 + \sec^{-1} x$

d) Both (a) and (b)

Question 35

The value of $\cos[\tan^{-1} \{ \sin(\cot^{-1} x) \}]$ is:

a) $\sqrt{(x^2+1)/(x^2+2)}$

b) $\sqrt{(x^2-1)/(x^2+2)}$

c) $\sqrt{(x^2+1)/(x^2-2)}$

d) None of these

Question 36

The principal value of $\sec^{-1}(-\sqrt{2})$ is:

- a) $\pi/4$
- b) $3\pi/4$
- c) $\pi/3$
- d) None of these

Question 37

The value of x ($\neq \pi/2$) which satisfies the equation $2\tan^{-1}(\sin x) = \tan^{-1}(2\sec x)$ is:

- a) $\pi/2$
- b) $\pi/3$
- c) $\pi/4$
- d) None of these

Question 38

The value of x satisfying $\tan^{-1}(x-1) + \tan^{-1} x + \tan^{-1}(x+1) = \tan^{-1} 3x$ is:

- a) 0
- b) $\pm 1/2$
- c) Both (a) and (b)
- d) None of these

Question 39

If $\sin[\cot^{-1}(x+1)] = \cos[\tan^{-1} x]$, then x is:

- a) 2
- b) $\pm\sqrt{2}$
- c) $\pm\sqrt{3}$
- d) None of these

Question 40

If $\tan^{-1} x + \tan^{-1} y + \tan^{-1} z = \pi/2$, then the value of $xy + yz + zx$ is:

- a) 1
- b) -1
- c) 0
- d) None of these

Question 41

If $\tan^{-1} x + \tan^{-1} y = \pi/2$, then the value of xy is:

- a) 1
- b) -1
- c) 0
- d) None of these

Question 42

If $f(x) = \sec^{-1} x + \tan^{-1} x$, then $f(x)$ is real $\forall x$ in:

- | | |
|-------------------------------------|------------------|
| a) $[-1, 1]$ | b) $\mathbb{R}$ |
| c) $(-\infty, -1] \cup [1, \infty)$ | d) None of these |

Question 43

If $y = \cos^{-1} [\cos(4\pi - 10)]$, then the value of y in $(0, \pi)$ is:

- a) $2\pi - 10$
- b) $4\pi - 10$
- c) $2\pi + 10$
- d) None of these

Question 44

If $\tan^{-1}(1+x) + \tan^{-1}(1-x) = \pi/6$, then x is:

- a) $\sqrt{3}$
- b) $2\sqrt{3}$
- c) $3\sqrt{2}$
- d) None of these

Question 45

If $\sin^{-1} [2a / (1+a^2)] + \cos^{-1} [(1-a^2)/(1+a^2)] = \tan^{-1} [2x / (1-x^2)]$, where $a, x \in (0, 1)$, then x is:

- | | |
|-------------------|-------------------|
| a) $2a$ | b) $2a / (1+a^2)$ |
| c) $2a / (1-a^2)$ | d) None of these |

Question 46

If $|x| \leq 1$, then $2 \tan^{-1} x + \sin^{-1} [2x / (1+x^2)]$ is equal to:

- | | |
|--------------------|--------------------|
| a) $\tan^{-1} x$ | b) $3 \tan^{-1} x$ |
| c) $4 \tan^{-1} x$ | d) None of these |

Question 47

If $\cos^{-1} x > \sin^{-1} x$, then:

- a) $0 \leq x < 1/\sqrt{2}$
- b) $0 < x \leq 1/\sqrt{2}$
- c) $0 \leq x < 1/\sqrt{3}$
- d) None of these

Question 48

$\operatorname{cosec}^{-1}(3/2) + \cos^{-1}(2/3) - 2 \cot^{-1}(1/7) - \cot^{-1}(7)$ is equal to:

- | | |
|----------------------|----------------------|
| a) $-\tan^{-1}(2/3)$ | b) $-\tan^{-1}(3/2)$ |
| c) $-\tan^{-1} 7$ | d) None of these |

Question 49

The value of $\cot^{-1} \left[\frac{(\sqrt{1-\sin x} + \sqrt{1+\sin x})}{(\sqrt{1-\sin x} - \sqrt{1+\sin x})} \right]$ is:

a) $\pi - x$

b) $\pi - 2x$

c) $\pi - x/2$

d) None of these

Question 50

If $\cos^{-1} \alpha + \cos^{-1} \beta + \cos^{-1} \gamma = 3\pi$, then $\alpha(\beta + \gamma) + \beta(\gamma + \alpha) + \gamma(\alpha + \beta)$ is:

- a) 0
- b) 6
- c) 15
- d) None of these

Question 51

If $\sin^{-1} [2\alpha / (1+\alpha^2)] + \sin^{-1} [2\beta / (1+\beta^2)] = 2 \tan^{-1} x$, then x is:

a) $(\alpha+\beta)/(1-\alpha\beta)$

b) $(\alpha-\beta)/(1+\alpha\beta)$

c) $(\alpha+\beta)/(1+\alpha\beta)$

d) None of these

Question 52

If $\sin^{-1} x + \sin^{-1} y + \sin^{-1} z = \pi$ then $x^4 + y^4 + z^4 + 4x^2y^2z^2$ is equal to:

- a) $x^2y^2 + y^2z^2 + z^2x^2$
- b) $2(x^2y^2 + y^2z^2 + z^2x^2)$
- c) $3(x^2y^2 + y^2z^2 + z^2x^2)$
- d) None of these

Question 53

The solution of the equation $\sin[2\cos^{-1}\{\cot(2\tan^{-1}x)\}] = 0$ is:

- | | |
|---|---------------------------------------|
| a) $\pm 1, -1 \pm \sqrt{2}, 1 \pm \sqrt{2}$ | b) $-1, \pm \sqrt{2}, 1 \pm \sqrt{2}$ |
| c) $2 \pm 2\sqrt{2}$ | d) None of these |

Question 54

The number of real solutions of the equation $\sqrt{1 + \cos 2x} = \sqrt{2} \cos^{-1}(\cos x)$ in $[\pi/2, \pi]$ is:

- a) 0
- b) 2
- c) 1
- d) None of these

Question 55

If $0 < x < 1$, then $\sqrt{1+x^2} [\{ x \cos(\cot^{-1} x) + \sin(\cot^{-1} x) \}^2 - 1]^{1/2}$ is:

- | | |
|--------------------|--------------------|
| a) $\sqrt{1+x^2}$ | b) $x\sqrt{1+x^2}$ |
| c) $x\sqrt{1-x^2}$ | d) None of these |

Question 56

The number of real solutions of $\tan^{-1} \sqrt{x(x+1)} + \sin^{-1} \sqrt{x^2+x+1} = \pi/2$ is:

- | | |
|------|------------------|
| a) 0 | b) 1 |
| c) 2 | d) None of these |

Question 57

If $a \leq \sin^{-1} x + \cos^{-1} x + \tan^{-1} x \leq b$, then:

a) $a = 0, b = 0$

b) $a = 0, b = \pi$

c) $a = 0, b = \pi/2$

d) None of these

Question 58

If x satisfies the equation $t^2 - t - 2 > 0$, then there exists a value for:

- | | |
|------------------|------------------|
| a) $\sin^{-1} x$ | b) $\cos^{-1} x$ |
| c) $\sec^{-1} x$ | d) None of these |

Question 59

If $A = \tan^{-1} \left[\frac{x\sqrt{3}}{2\lambda - x} \right]$ and $B = \tan^{-1} \left[\frac{(2x - \lambda)}{(\lambda\sqrt{3})} \right]$, then $A - B$ is:

- a) 45°
- b) 30°
- c) 60°
- d) None of these

Question 60

Statement-1: The value of $\cos^{-1} [(\sqrt{1-\sin x} + \sqrt{1+\sin x}) / (\sqrt{1-\sin x} - \sqrt{1+\sin x})]$ is $\pi - x/2$

Statement-2: $\tan^{-1} x + \cot^{-1} x = \pi/2$

Choose the correct option based on the statements above:

- | | |
|--|--|
| a) Statement-1 and Statement-2 are true;
Statement-2 is the correct explanation for
Statement-1. | b) Statement-1 and Statement-2 are true;
Statement-2 is NOT the correct explanation
for Statement-1. |
| c) Statement-1 is true, Statement-2 is false. | d) Statement-1 is false, Statement-2 is true. |

Question 61

Statement-1: $\sin^{-1}(12/13) + \cos^{-1}(4/5) + \tan^{-1}(63/16) = \pi$

Statement-2: $\tan^{-1} x + \tan^{-1} y = \pi + \tan^{-1}[(x+y)/(1-xy)]$ if $xy > 1$

Choose the correct option based on the statements above:

- | | |
|--|--|
| a) Statement-1 and Statement-2 are true;
Statement-2 is the correct explanation for
Statement-1. | b) Statement-1 and Statement-2 are true;
Statement-2 is NOT the correct explanation
for Statement-1. |
| c) Statement-1 is true, Statement-2 is false. | d) Statement-1 is false, Statement-2 is true. |

Question 62

Statement-1: The number of root the equation $\cot^{-1} x + \cot^{-1} 2x + \pi = 0$ is zero.

Statement-2: Range of $\cot^{-1} x$ and $\cos^{-1} x$ is $(0, \pi)$ and $[0, \pi]$ respectively.

Choose the correct option based on the statements above:

- | | |
|--|--|
| a) Statement-1 and Statement-2 are true;
Statement-2 is the correct explanation for
Statement-1. | b) Statement-1 and Statement-2 are true;
Statement-2 is NOT the correct explanation
for Statement-1. |
| c) Statement-1 is true, Statement-2 is false. | d) Statement-1 is false, Statement-2 is true. |

Question 63

Statement-1: Principal value of $\cos^{-1}(\cos 30)$ is $30 - 9\pi$

Statement-2: $(30 - 9\pi) \in [0, \pi]$

Choose the correct option based on the statements above:

- | | |
|--|--|
| a) Statement-1 and Statement-2 are true;
Statement-2 is the correct explanation for
Statement-1. | b) Statement-1 and Statement-2 are true;
Statement-2 is NOT the correct explanation
for Statement-1. |
| c) Statement-1 is true, Statement-2 is false. | d) Statement-1 is false, Statement-2 is true. |

Question 64

Statement-1: Domain of $\tan^{-1} x$ and $\cot^{-1} x$ is $\mathbb{R}$

Statement-2: $f(x) = \tan x$ and $g(x) = \cot x$ are unbounded functions.

Choose the correct option based on the statements above:

- | | |
|--|--|
| a) Statement-1 and Statement-2 are true;
Statement-2 is the correct explanation for
Statement-1. | b) Statement-1 and Statement-2 are true;
Statement-2 is NOT the correct explanation
for Statement-1. |
| c) Statement-1 is true, Statement-2 is false. | d) Statement-1 is false, Statement-2 is true. |

Question 65

Statement-1: $\tan^{-1}(3/4) + \tan^{-1}(1/7) = \pi/4$

Statement-2: For $x > 0, y > 0$, $\tan^{-1}(x/y) + \tan^{-1}[(y-x)/(y+x)] = \pi/4$

Choose the correct option based on the statements above:

- | | |
|--|--|
| a) Statement-1 and Statement-2 are true;
Statement-2 is the correct explanation for
Statement-1. | b) Statement-1 and Statement-2 are true;
Statement-2 is NOT the correct explanation
for Statement-1. |
| c) Statement-1 is true, Statement-2 is false. | d) Statement-1 is false, Statement-2 is true. |